**Commonwealth of Kentucky**
**Division for Air Quality**

# *PERMIT STATEMENT OF BASIS*

FEDERALLY ENFORCEABLE CONDITIONAL MAJOR (DRAFT PERMIT) NO. F-06-010
OWENSBORO GRAIN BIODIESEL, L.L.C.
OWENSBORO, KY
MAY 10, 2006
RALPH GOSNEY, P.E., REVIEWER

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| SOURCE I.D. #: | 021-059-00211 |
| SOURCE A.I. #: | 77459 |
| ACTIVITY I.D. #: | APE20060001 |

**SOURCE DESCRIPTION:**

Owensboro Grain Biodiesel, L.L.C. has proposed the installation of a new source that will produce biodiesel fuel. The source will consist of a biodiesel production unit having a maximum production rate of 42,000 pounds of biodiesel per hour, 5,100 pounds of crude glycerine per hour and 550 pounds of fatty acids per hour. The raw materials used are refined vegetable oil, methanol and sodium methoxide.

Owensboro Grain Biodiesel will be located immediately adjacent to Owensboro Grain Edible Oils, LLC, source I.D. 21-059-00175. Owensboro Grain Edible Oils is permitted to produce table oils, margarine and other edible fats and oils and supplies vegetable oil to Owensboro Grain Biodiesel. Both plants share common ownership. However, since both plants operate under different SIC codes the Kentucky Division for Air Quality considers Owensboro Grain Biodiesel as a separate source from adjacent Owensboro Grain Edible Oils.

The uncontrolled emissions of any single HAP is equal to or greater than ten (10) tons per year and the combination of HAPs is equal to or greater than twenty-five (25) tons per year. However, the source has requested voluntary permit emission limits of 9 tons per year (tpy) or less of a single hazardous air pollutant (HAP), and 22.5 tpy of less of combined HAPs. Therefore, the source is subject to the provision of 401 KAR 52:030.

This permit is the initial construction and Conditional Major operating permit for this new source.

**COMMENTS:**

1) Emission Units: Biodiesel Production, consisting of three (3) 180,000 gallon methanol storage tanks; one (1) 18,000 gallon storage tank used for storage of sodium methoxide in a solution of methanol; and a DeSmet Ballestra Model 45 MMGY biodiesel production unit with a maximum production rate of 42, 000 pounds of biodiesel per hour, 5,100 pounds of crude glycerine per hour and 550 pounds of fatty acids per hour. The raw materials used are refined vegetable oil, methanol and sodium methoxide.

a) Potential to Emit Calculations

Source engineering judgment was used to determine the VOC and HAP emissions from the tanks and the Biodiesel production unit. The applicant conducted computer modeling of the vent gas recovery system. The vent gases from the four tanks (3 methanol and one sodium methoxide in methanol solution) and biodiesel production unit are piped to a common header and are ducted to the control system (condenser, chiller and scrubber in series, see below) and exhaust the system from a single vent (scrubber vent). An equilibrium condition was developed for the gaseous mixture entering the vent gas recovery system at 40°C to estimate pollutant (hexane and methanol, both as VOCs) emission rates at the system exhaust point.

b) Applicable Regulations

i. 401 KAR 63:020, *Potentially hazardous matter or toxic substances*.

The biodiesel production unit is subject to the 401 KAR 63:020. The requirements of this rule are as follows:

Control of Potentially Hazardous Matter and Toxic Substances. Persons responsible for a source from which hazardous matter or toxic substances may be emitted shall provide the utmost care and consideration, in the handling of these materials, to the potentially harmful effects of the emissions resulting from such activities. No owner or operator shall allow any affected facility to emit potentially hazardous matter or toxic substances in such quantities or duration as to be harmful to the health and welfare of humans, animals and plants.

ii. 401 KAR 60:005, Section 3, incorporating by reference 40 CFR 60.110b to 60.117b (Subpart Kb), Standards *of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984*

Since the three (3) 180,000 gallon methanol storage tanks have a design capacity greater than 151 $m^3$ (39,890 gallons) containing a stored VOL with a maximum true vapor pressure equal to or greater than 5.2 kPa and less than 76.6 kPa, the permittee is subject to VOC emission control requirements of 40 CFR 60.112b. Pursuant to the proposed design of this plant and these storage tanks, the permittee shall comply with the standard for volatile organic compounds (VOC), 40 CFR 60.112b(a)(3), as follows:

The permittee shall equip each of the three (3) 180,000 gallon methanol storage tanks with a closed vent system and control device meeting the following specifications:

i. The closed vent system shall be designed to collect all VOC vapors and gases discharged from the storage vessel and operated with no detectable emissions as indicated by an instrument reading of less than 500 ppm above background and visual inspections, as determined in part 60, subpart VV, 40 CFR60.485(b).

ii. The control device shall be designed and operated to reduce inlet VOC emissions by 95 percent or greater.

These requirements, and the related testing, reporting, record keeping, and monitoring requirements are incorporated into the permit.

c) Non Applicable Regulations

i. This source has requested voluntary permit emission limits of 9 tons per year (tpy) or less of a single hazardous air pollutant (HAP), and 22.5 tpy of less of combined HAPs. As such, this source will not be a major source of HAP emissions, and there are no *NESHAPs* (40 CFR 63 and 401 KAR 63) applicable to this area source for HAP emissions, as such is defined at 40 CFR 63.2.

ii. The one (1) 18,000 gallon storage tank used for storage of sodium methoxide in a solution of methanol is less than 75 $m^3$ and it is not subject to 40 CFR 60, Subpart Kb. The tanks listed as insignificant activities having capacities at or greater than 151 $m^3$ are not subject to 40 CFR 60, Subpart Kb because the stored liquids have a maximum vapor pressure less than 3.5 kPa, and vegetable oil is not a VOL.

iii. Pursuant to 401 *KAR 59:050, New Storage Vessels for Petroleum Liquids*, this rule applies to each storage vessel for petroleum liquids with a storage capacity of greater than 2,195 liters (580 gallons) that commenced before the classification date of July 24, 1984, and which is located in a county or portion of a county designated ozone nonattainment under 401 KAR 51:101, except marginal nonattainment. These vessels did not commence before the classification date of July 24, 1984.

d) Control Device:

Combination of Water-Cooled Vent Gas Condenser, Water/Glycol Vent Gas Chiller and Packed Bed Soybean Oil Scrubber, in series, with an overall system control efficiency of 98.5%. Vent gases from the methanol storage tanks (3), sodium methoxide in methanol storage tank (1), and biodiesel production unit are ducted to this control system.

2) Insignificant Activities

a) Applicable Regulations

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| i. One (1) 54,000 Gallon Soybean Oil Feedstock Tank | None |
| ii. Three (3) 54,000 Gallon Biodiesel Tanks | None |
| iii. Two (2) 455,000 Gallon Biodiesel Tanks | None |
| iv. Two (2) 13,000 Gallon Glycerine Tanks | None |
| v. One (1) 455,000 Gallon Glycerine Tank | None |
| vi. One (1) 13,000 Gallon Fatty Acid Tank | None |
| vii. Pipeline Equipment Fugitive Emissions: | 401 KAR 63:010 |
| Pumps - 24 (count) | |
| Flanges - 716 (count) | |
| Valves - 322 (count) | |
| Agitators - 3 (count) | |
| Centrifuge- 1 (count) | |
| viii. Storage Tank Fugitive Emissions: | 401 KAR 63:010 |
| Pumps - 2 (count) | |
| Flanges - 28 (count) | |

b) Non Applicable Regulations

Pursuant to *401 KAR 59:050, New Storage Vessels for Petroleum Liquids*, this rule applies to each storage vessel for petroleum liquids with a storage capacity of greater than 2,195 liters (580 gallons) that commenced before the classification date of July 24, 1984, and which is located in a county or portion of a county designated ozone nonattainment under 401 KAR 51:101, except marginal nonattainment. These vessels did not commence before the classification date of July 24, 1984.

c) Control Device: None

**EMISSION AND OPERATING CAPS DESCRIPTION:**

Owensboro Grain Biodiesel has requested voluntary permit emission limits of 9 tons per year (tpy) or less of a single hazardous air pollutant (HAP) and 22.5 tpy or less of combined HAPs. Compliance with these limitations shall also limit total volatile organic compound (VOC) emissions from the source to 90 tpy or less. Compliance with these permit limits shall make the requirements of 401 KAR 52:020, Title V permits, not applicable to this source. Compliance with these limits shall also make the requirements of 40 CFR Part 63 for major sources of HAP emissions, as incorporated by reference at 401 KAR 63:002, not applicable to this source.

**CREDIBLE EVIDENCE:**

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997,

the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.